CLAIMS

What is claimed is:

1. A method of providing vascular therapy to a human or veterinary patient who is in cardiac failure resulting in subnormal cardiac output, said method comprising the steps of:

a) cooling the patient's heart to a temperature that is at least 1°C below normothermia; and,

b) maintaining the temperature of the patient's heart at least 1°C below normothermia for a sufficient period of time to provide improved cardiac output.

2. The method of claim 1 wherein steps a) and b) are carried out at least in part by i) inserting a cooling catheter into the patient's vasculature, said cooling catheter having a heat exchange region and a core, said heat exchange region thermally coupled to said core, the cooling catheter being positioned within the patient's vasculature such that the heat exchange region is positioned in the lumen of a blood vessel, the inner diameter of the blood vessel lumen being larger than the outer diameter of said heat exchange region, and ii) exchanging heat between blood flowing past said heat exchange region and said heat exchange region for sufficient time to cool the patient's heart tissue to a temperature at least 1°C less than normothermia.

3. The method of claim 2 wherein the cooling catheter is positioned such that its heat exchange region is in the inferior vena cava of the patient.

4. The method of claim 2 wherein said core comprises flowing heat exchange fluid.

5. The method of claim 2 wherein steps a and b are carried out by circulating heat exchange fluid through an external heat exchanger to alter or maintain the temperature of said heat exchange fluid and through the catheter core to exchange heat between the heat exchange fluid and the patient's circulating blood.

6. The method of claim 1 wherein the patient's heart is cooled to a temperature below 35.5°C.

7. The method of claim 6 wherein an anti-shivering treatment is administered to prevent the patient from shivering.

8. The method of claim 7 wherein the anti-shivering treatment includes one or more of the anit-shivering mechanisms selected from the group consisting of:

a) a warming blanket;

b) busparone;

c) meperidine; and

d) dexmedetomidine.

9. The method of claim 1 wherein the patient's heart is cooled for a period of at least 3 hours.

10. The method of claim 1 wherein hypothermia is induced using one or more methods selected from the group consisting of:

a) endovascular cooling;

b) esophageal cooling;

c) gastric cooling;

d) surface cooling; and

e) cooling with a cooling tent.

11. The method of claim 1 further comprising the step of:

c) placing a temperature probe in or on the patient to sense the temperature of part of a patient and to generate a temperature signal based on said sensed temperature, and controlling the patient temperature based on said temperature signal.

12. The method of claim 11 wherein a temperature probe is placed at one or more locations selected from the group consisting of:

on or in the heart;

on or in a muscle;

on or in a thigh;

in the esophagus;

upon or near the tympanic membrane;

on or near the skin;

within the bladder;

in the rectum; and,

within the vasculature in contact with the patient's blood .

13. The method of claim 1 wherein, prior to performance of steps a) and b), the patient is diagnosed as suffering from cardiac failure based on at least one indicia of cardiac failure selected from the group consisting of:

a) cardiac output below 2.5 liters per minute;

b) stroke volume below 25 cc;

c) ejection fraction below 40%;

d) echocardiographic findings;

e) physical examination findings;

f) cardiomegally;

g) increased left ventricular wall thickness and chamber dilation;

h) pulmonary edema;

i) angiographic findings;

j) findings on cardiopulmonary exercise testing; and

k) diagnostic tests of blood components.

14. The method of claim 1 wherein the method is performed to stabilize the patient's condition prior to performance of an interventional medical procedure or surgery.

15. A method of treating congestive heart failure in a human or veterinary patients comprising the steps of:

a) providing a heat exchange catheter having a shaft, a heat exchange

surface, an inlet lumen and an outlet lumen;

b) placing said heat exchange catheter in the blood stream of the patient ;

c) circulating said heat exchange fluid at a temperature below normothermia through the inlet lumen to cool the heat exchange surface , and then out of the outlet lumen for a period of time sufficient to induce hypothermia in said patient such that said patient's heart is 36°C or cooler; and

d) maintaining the patient's heart at a temperature at or below 36°C for at least ½ hour.